

Little (gas. I.)

PUNCTURE OF THE BLADDER

BY

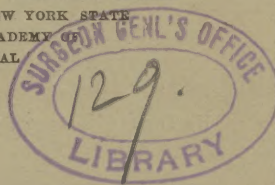
DIEULAFOY'S ASPIRATOR;

WITH A DESCRIPTION OF THE INSTRUMENT.

BY

JAMES L. LITTLE, M. D.,

SURGEON TO ST. LUKE'S HOSPITAL; LECTURER ON OPERATIVE SURGERY AND SURGICAL
DRESSINGS, COLLEGE PHYSICIANS AND SURGEONS, N. Y.; PERMANENT MEMBER
AMERICAN MEDICAL ASSOCIATION, AND OF THE NEW YORK STATE
MEDICAL SOCIETY; MEMBER NEW YORK ACADEMY OF
MEDICINE, NEW YORK PATHOLOGICAL
SOCIETY, ETC., ETC.



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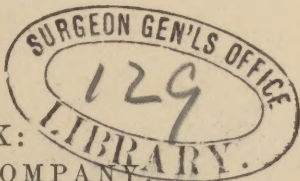
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PUNCTURE OF THE BLADDER BY DIEULAFOY'S ASPIRATOR; WITH A DESCRIPTION OF THE INSTRUMENT.

THE Pneumatic Aspirator has been in use in Paris for the past three years. Its invention is claimed by Dr. Dieulafoy, and also by Dr. Potain, of Paris, both having constructed instruments called by their respective names.

Dr. Protheroe Smith, of London, also claims to be the originator, which claim he sets forth in the *Lancet* of July 11, 1870.

These instruments, however, are the same in principle, but differ somewhat in their construction.

The principle involved in this instrument, that of removing fluids from cavities by means of capillary tubes assisted by a suction-pump, so as not to leave an open wound or admit air, has been in use in this country for many years.

Dr. Bowditch, of Massachusetts, published a paper in the *American Journal of Medical Sciences* in 1852, on the operation of paracentesis thoracis, in which he advocated the puncture of the thoracic cavity with a very small exploring needle about the size of Dieulafoy's No. 3 capillary trocar, and the removal of the fluid by means of a syringe very similar in its construction to the smaller aspirator of Dieulafoy. The principle is the same. The wound thus made being so small, there is no danger of the entrance of air, and no fear

of leaving a fistulous opening. He reports fifty cases in which this operation was performed, without any evil results.

Dr. T. G. Thomas, of this city, has also for many years used a small capillary trocar with a syringe attached, for the purpose of withdrawing fluids from abdominal tumors, to assist in diagnosis.

But, if the principle is not new, we certainly have to thank Dr. Dieulafoy for constructing an instrument which for convenience and safety has not been excelled, and contributing to popularize the operation, thus extending its usefulness.

The accompanying woodcut shows Dieulafoy's larger aspirator, which is now made by Messrs. Tiemann & Co., of this city.

This instrument consists of a glass cylinder, H, about 7 inches in height and 2 in diameter, with a tight-fitting piston. The cylinder is partly covered with a casing of German silver, nickel-plated. In front is a graduated scale, showing the amount of contained fluid in grammes—the gramme in this case being used as a measure of capacity and not of weight, each gramme being equal to the space occupied by a cubic centimetre of water, at the temperature of 39.2° Fahr. The cylinder holds 145 grammes, equal to nearly 4 fluidounces.

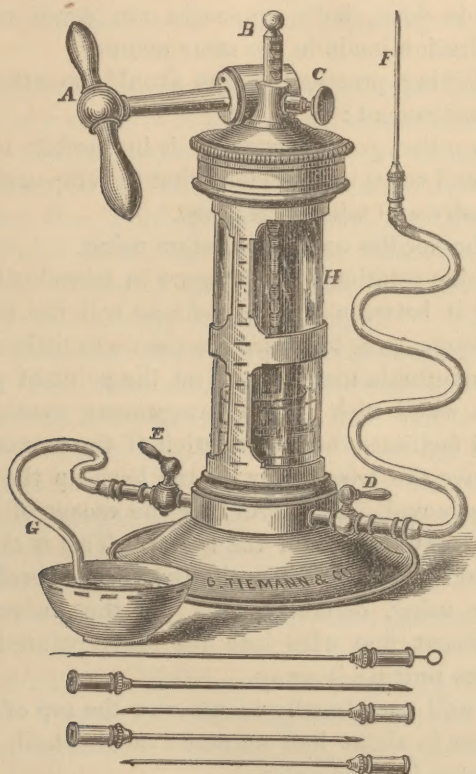
The piston B is raised or lowered by turning the handle A. Near the bottom of the cylinder are two taps with stopcocks, D and E. To these are fitted two rubber tubes, as seen in the cut.

To the extremity of the one, connected with D, a capillary trocar may be attached. About four inches from this end of the tube is inserted a piece of glass tubing about three inches in length, so as to allow the fluid to be seen passing to the cylinder. This is not shown in the woodcut.

The contents of the cylinder are discharged through the rubber tube attached to the tap E.

The capillary tubes, or trocars as they called, represented below the instrument, are six in number, sharp-pointed, and of different sizes, the smallest being about the calibre of the tube of the hypodermic syringe, or one-third of a millimetre in diameter, and the largest one and a half millimetre, and all of them four inches in length.

In addition to these tubes there should be two or three small, blunt canulas with trocars, and a detachable handle, so that, when the trocar is withdrawn, the canula may be attached to the instrument.



The manner of using the pneumatic aspirator is as follows :

The instrument is first prepared by attaching the rubber tubes to the taps D and E. After selecting the capillary trocar, it is to be connected to the tube attached to the tap D, as represented in the cut. The extremity of the tube G should be placed in a basin, to receive the contents of the cylinder.

Closing the stop-cocks D and E, the piston is raised by turning the handle A, and is retained in position by the spring C. In this way nearly a perfect vacuum is obtained. The

capillary trocar is then introduced with a rotary motion into the part from which the fluid is to be drawn. The stop-cock D is then opened, and the fluid rushes into the cylinder, which, when full, is emptied by closing stop-cock D and opening E, pulling out spring C, and lowering the piston. When this is done, both stop-cocks are again closed, and another aspiration made in the same manner.

The following practical points should be attended to in using this instrument:

1. Be sure that your instrument is in perfect order—that the trocars and tubes are pervious, that the stop-cocks and piston work easily and without leakage.

2. Oil the needles or trocars before using.

3. Combine rotation with pressure in introducing the trocar, holding it between the index-finger and the thumb, and introduce slowly, so as to injure the tissues as little as possible.

Local anæsthesia may be used at the point of puncture if desired. A small nick in the integument, made with the scalpel, will facilitate the introduction of the trocar.

4. Remove the trocar slowly, and keep up the aspiration during its removal. This prevents the escape of any of the fluid which may remain in the trocar. This is always to be borne in mind whenever the peritonæum is perforated.

5. After using, carefully wash out the instrument and tubes, and insert fine wire into the sharp-pointed trocar or canula before putting it away.

6. It is well occasionally to unscrew the top of the cylinder and pour in about half an ounce of sweet-oil. This will keep the piston in good order.

This instrument has been used extensively in Paris by Drs. Dieulafoy, Watelet, Potain, and others, for removing fluids from the pleural cavity in cases of hydrothorax or empyema; from the cranial cavity in cases of hydrocephalus; from the knee-joint in cases of synovitis; for removing pus from abscesses; for removing gas and the fluid contents of the intestines in cases of strangulated hernia, and thus allowing the gut to be reduced by taxis; also in diagnosing hydatids and abscesses of the liver and tumors of the abdomen; and, lastly, it has been used for puncturing the bladder above

the pubes to relieve retention of urine caused by stricture, enlarged prostate, or injuries of the urethra, and as yet *no case has been reported in which any trouble has followed the punctures thus made.* It has also been used to some extent in England, and in this city Drs. Sands, Weir, Markoe, Loomis, and others, have used it for various purposes, with the same results.

In this paper I wish to call the attention of the profession to its value as a means of relieving retention of urine by puncture of the bladder above the pubes. In a paper entitled "Contributions to the Surgery of the Male Urethra," published in the *New York Medical Record*, July 15, 1872, Dr. Briddon alluded to its use in Paris for retention, but, as far as I know, the following case is the first in which it has been resorted to in this country for this purpose:

CASE. *Retention from Enlarged Prostate; Fourteen Punctures.*—Mr. Raymond, aged sixty-eight; had enjoyed good health until five years ago, when he began to experience difficulty in micturition. About two years ago he had an attack of retention, which was relieved by the passage of a No. 3 silver catheter. During the night of September 5, 1872, he found himself unable to pass his urine, and in the morning sent for his physician, Dr. Samuel W. Dana, who made several ineffectual attempts to pass a catheter.

September 6th.—At 1 o'clock p. m. I was called in consultation, and found him suffering severe pain from distention of his bladder. Percussion above the pubes showed dulness as high as the umbilicus. Examination *per rectum* revealed a very great enlargement of the prostate gland. There had been considerable bleeding from the urethra, from the attempts to pass the catheter. I first endeavored to introduce a large prostatic silver catheter, well curved, but, not succeeding, tried a No. 10 gum-elastic, both with and without the stilet. This also failed to enter the bladder. The point of the catheter could be felt by the finger in the rectum near the neck of the bladder, and in spite of all my efforts it seemed to point downward and press upon the rectum instead of riding over the enlarged prostate into the bladder. Various curves of the instrument were tried, but with no better result.

A vulcanized rubber, a bulbous-ended French catheter, and Squire's vertebrated catheter were also ineffectually tried. The bleeding was very considerable during these efforts. All this time the patient was in great agony from the accumulation of urine, and begging for relief.

I proposed to Dr. Dana that we should try the puncture above the pubes by means of the *Aspirateur-pneumatique sous-cutanée par Dieulafoy*. Dr. Robert F. Weir kindly loaned me his instrument, and assisted me in using it. A nick in the integument was made about an inch and a half above the pubes, and the capillary trocar No. 2, one size larger than the tube of the ordinary hypodermic syringe, was passed through the tissues into the bladder, and about 800 grammes of bloody urine removed. The pain of this operation was very slight and the relief so great that the patient fell asleep as soon as the urine began to flow, and did not awake until some time after the operation was finished. The time required to withdraw this amount of urine was about three minutes.

10 P. M.—The puncture this time was made about half an inch below the other, and about 500 grammes of urine removed. The urine was clear, and on examination was found to be of acid reaction, and, with the exception of a few blood-globules, contained nothing abnormal.

September 7th, 11 A. M.—Patient comfortable, pulse 78. Bowels moved during the night, and he passed a few drops of water at the same time.

Puncture made in a new place with a No. 1 needle, and, after 40 grammes of urine were removed, the flow ceased. This difficulty I have not been able to explain satisfactorily to myself. Another puncture was made a little higher, and nearly 500 grammes drawn out.

11 P. M.—Fifth puncture, a few lines to the right of the last, and 480 grammes of urine removed. Pulse 68; temperature normal. No tenderness at seat of punctures. Has been taking during the day tr. ferri sesquichlorid. gtt. xx, every two hours.

September 8th, 10½ A. M.—Sixth puncture just above the pubes; needle passed in with more than usual pain, and with

some difficulty, without any urine making its appearance. Seventh puncture at a higher point, and 400 grammes removed. It was now deemed best to see if an entrance could be effected into the bladder by the urethra; and, after considerable difficulty, a No. 12 silver catheter was passed into the bladder. The pain was very considerable, and the bleeding quite free; and on consultation with Dr. Dana it was considered advisable to rely on the aspirator, for a day or two, to relieve his bladder and allow the urethra to become in better condition.

9 P. M.—Patient has suffered during the day from severe straining-spells, which he thinks were excited by the passage of the catheter this morning. Eighth puncture, 490 grammes.

September 9th, 10½ P. M.—Ninth puncture, 420 grammes. Free movement of bowels during the night.

7½ P. M.—Tenth puncture, 500 grammes.

11 P. M.—Eleventh puncture, about 300 grammes.

September 10th, 5½ A. M.—Twelfth puncture, 320 grammes.

Ordered balsam copaibæ 3 ss., liq. potass. 3 iss., aq. camphor. ʒ vj, one ounce to be taken three times a day.

2 P. M.—Thirteenth and fourteenth punctures, both of which failed to enter the bladder. In making the thirteenth puncture, the trocar, I think, passed in above the bladder, although it was not introduced higher externally than the previous punctures; this was evidently due to the position of the patient in bed, his shoulders being elevated more than usual, and consequently the bladder, which was not much distended by urine, was pressed down into the pelvis by the weight of the abdominal viscera. The fourteenth puncture failed, because the point of the instrument was too much inclined, and came in contact with the symphysis pubes. As the patient was not suffering at the time from accumulation of urine, it was at first decided to wait a few hours before making another puncture, but afterward it was thought best to try a catheter and see if he could bear its introduction. A No. 9 English gum-elastic catheter, with the stilet and a very long curve, was carefully introduced, and passed without any pain or bleeding into the bladder, and a small quantity of urine withdrawn.

From this time his urine was removed by the catheter, in the usual way, and the remainder of the history is that of an ordinary case of enlarged prostate. No tenderness followed the punctures, and in a few days all traces of them had disappeared. The patient at last accounts was passing the greater portion of his urine without the catheter. No cystitis had taken place. During the time the aspirator was being used, he was free from all constitutional disturbance.

Remarks.—In this case the aspirator proved to be of great service. Without this instrument we would have had no other resource than puncture of the bladder through the rectum; above the pubes, in the old way; or through the perinæum—operations always more or less grave in their character. With the capillary trocar we were enabled to puncture fourteen times—three of which failed to reach the bladder, without, however, producing the slightest unpleasant result. No tenderness or pain followed any of the operations.

With regard to the failures in reaching the bladder, I think two of them may be explained by the fact that the trocar was directed at too great an inclination downward, so that the trocar came in contact with the symphysis; and in the other case the position of the patient in bed was such that the bladder, not containing much urine, was pushed down in the pelvis out of the reach of the instrument. The needle here passed in above the bladder, and of course it is impossible to know whether it penetrated the fold of the peritonæum or not.

Mr. Watelet states in a pamphlet,¹ on the puncture of the bladder by the pneumatic aspirator, that “a wound of the peritonæum or the intestine is not to be feared. He says, “un autre avantage de ce procédé, c’est que la blessure du péritoine ou de l’intestin ne sont pas à redouter. Le chirurgien n’est plus obligé de se demander s’il fait la ponction trop hard; il peut hardiment opérer.” In this monograph he reports several cases in which it was used for retention of urine from stricture, from hypertrophy of the prostate, and injuries of the urethra, and in these cases not the slightest unpleasant result

¹ “De la Ponction de la Vessie à l’aide du Trocar capillaire et de l’Aspiration pneumatique,” Paris, 1871.

followed any of the punctures. He reports one case where the patient died from dysentery, during the use of the aspirator for retention from enlarged prostate; and, although the patient had received twenty-five punctures in twelve days, on *post-mortem* examination, only four very small, dark points could be discovered on the inner surface of the bladder, indicating the sites of the punctures. No abscess or infiltration of blood in the coats of the bladder could be found as the result of the punctures; and in concluding his able and valuable paper he asserts that—

1. The capillary puncture is an operation entirely free from danger.

2. In all cases it should be substituted for the ordinary hypogastric puncture.

3. The bladder may be punctured three or four times a day, and replace catheterism in cases where that operation is impossible.

Now, admitting that the puncture with the capillary trocar is harmless, and, as far as we know of its use in Paris, England, and in this city, no accident has yet resulted from its use, every practical surgeon will see, at once, the invaluable aid it will furnish in this department of surgery alone.

In cases of stricture¹ where retention has come on from a night's debauch, and where we find so much difficulty and lose so much precious time in endeavoring to pass the filiform bougie so as to relieve the patient from his retention, the surgeon may with safety resort to this instrument and thus relieve the patient, and afterward take his time in finding his way through the contracted urethra; and in many cases this will be facilitated by the subsidence of the congestion of the mucous membrane by rest and antiphlogistic treatment.

In conclusion, I would suggest that, in using this instrument for puncture of the bladder, the following rules should be observed:

¹ *Puncture of the Bladder for Retention from Traumatic Stricture.*—On October 22d, at 9 P. M., I was called to see a patient in St. Luke's Hospital, who was suffering from retention of urine resulting from a traumatic stricture of the urethra. Finding it impossible to introduce the smallest-sized bougie, I punctured the bladder above the pubes, and withdrew the urine by means of Dieulafoy's smaller aspirator. The patient passed a comfortable night, and the following day I performed external urethrotomy.

1. The patient should lie on his back, and, if the bladder is not much distended, the operation will be facilitated by slightly elevating the patient's hips by means of a pillow placed beneath them.

2. The punctures should be made on or near the median line, from one inch to one inch and a half above the pubes, and should be made each time in a different place. In the case described, the punctures were about a line apart, and extended over an area about half an inch in diameter. Mr. Watelet recommends the No. 2 capillary trocar, but, in cases where cystitis exists and the urine is loaded with pus, mucus, or the phosphates, one of the larger trocars may be used with safety.

3. The bladder may, when necessary, be washed out by filling the cylinder with water from the basin, and reversing the action of the instrument, without withdrawing the trocar from the bladder.

An interesting case of puncture of the bladder is reported by H. K. Clark, M.D., of Geneva, N. Y., in the *New York Medical Record* of June 1, 1872, occurring in the practice of Dr. Geo. N. Dox, of the same place, which shows the harmlessness of puncture above the pubes when made by a small trocar. In this case, one of retention from enlarged prostate, six or seven punctures were made with a trocar and canula one-twelfth of an inch in diameter. Each puncture was made without regard to the point of previous puncture, and the canula withdrawn as soon as the bladder was emptied. No unpleasant effects followed these operations. With the aspirator a much smaller trocar can be used; and, if perchance the peritonæum be wounded, no bad results would follow, which would not probably be the case if the injury was produced by a larger instrument.

The case of Dr. Dox is one of great interest to every practical surgeon.

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